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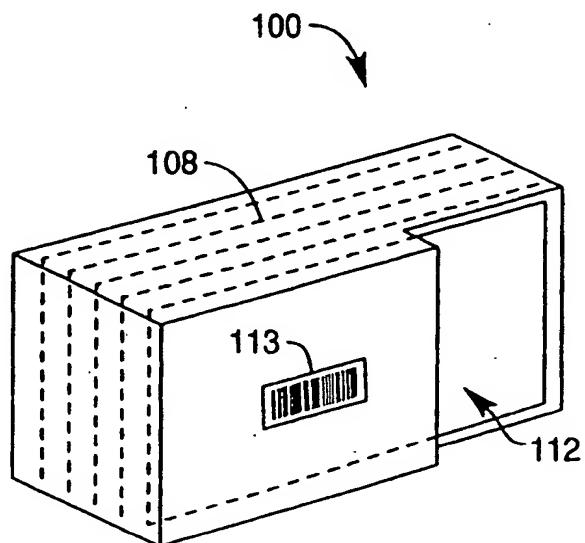
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : G07D 11/00	A1	(11) International Publication Number: WO 00/31695 (43) International Publication Date: 2 June 2000 (02.06.00)
(21) International Application Number: PCT/GB99/03677		(81) Designated States: BR, CN, JP, US, ZA, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).
(22) International Filing Date: 8 November 1999 (08.11.99)		
(30) Priority Data: 9825509.4 20 November 1998 (20.11.98) GB		Published <i>With international search report.</i>
(71) Applicant (<i>for all designated States except US</i>): NCR INTERNATIONAL, INC. [US/US]; 1700 South Patterson Boulevard, Dayton, OH 45479 (US).		
(72) Inventors; and		
(75) Inventors/Applicants (<i>for US only</i>): SHEPHERD, Alan [GB/GB]; 5 Kirkton of Tealing, Tearling, Dundee (GB). PEEBLES, John, Alexander [GB/GB]; 11 Sutherland Place, Dundee DD2 2HL (GB). TAYLOR, Norman, George [GB/GB]; 2 Invergowrie Drive, Dundee DD2 3XX (GB). MCCarron, Mary, Louise [GB/GB]; 8 Abbey Park, Abbey Park, Sccone PH2 6LW (GB).		
(74) Agent: WILLIAMSON, Brian; International Patent Department, NCR Limited, 206 Marylebone High Street, London NW1 6LY (GB).		

(54) Title: DISPENSING CONTAINER

(57) Abstract

A dispensing container for storing valuable media and a self-service terminal (such as an ATM) for using these dispensing containers are described. The container has frangible portions to allow opening of the container, so that when the container is loaded into an ATM, the ATM breaks the frangible portions to define an opening through which the contents of the container are dispensed. The ATM incorporates a housing for storing these containers; a breaching mechanism for breaking the frangible portions and defining an opening; and emptying mechanism for removing valuable media from the opening; and a discharging mechanism for discarding empty containers.



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DISPENSING CONTAINER

The invention relates to a dispensing container for use with a self-service terminal (SST), and to an SST for using such a dispensing container. In particular, the invention relates to a dispensing container for storing valuable media in sheet form, such as currency, share certificates, flight coupons, and such like; and to an SST for dispensing valuable media from such dispensing containers.

Many conventional SSTs, such as Automated Teller Machines (ATMs), dispense valuable media. An ATM dispenses currency in the form of bank notes. These bank notes are stored in a reusable dispensing container called a currency cassette. A typical currency cassette is shown in Fig 1. The cassette 10 is typically a strong metal or plastics box 12 having a removable lid 14. The lid 14 has a slot 16 (which is automatically covered when not engaged with an ATM) through which an ATM removes notes 18 from the cassette 10 in response to a cash withdrawal request initiated by a user.

The cassette 10 stores a large number of bank notes (e.g. three thousand notes) 18 in a single stack. The notes 18 rest on a plate 20 which is urged towards the top 22 of the box 12 by a spring 24. When a cassette 10 has been filled with bank notes 18 (Fig 1 shows the cassette approximately half full) then the lid 14 is secured to the front of the cassette 10, and the cassette 10 is loaded into an ATM.

In use, when a cash withdrawal function is requested, the ATM removes one bank note at a time from the cassette

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10 until the correct number of notes have been removed. When the number of notes 18 in the cassette 10 falls below a predetermined threshold then the cassette must be removed to a currency centre, the contents of the cassette 5 reconciled to ensure that all of the bank notes have been accounted for, and the cassette replenished with bank notes.

This type of cassette 10 has a number of disadvantages. Cassettes which have to be replenished 10 still contain a number of notes and therefore must be guarded carefully when conveyed between the ATM and the replenishment centre. The replenishing operation is quite complex because the remaining bank notes have to be reconciled with the number of bank notes dispensed. The 15 cassettes are expensive. The cassettes cannot be replenished in use in an ATM. When a cassette is removed then the ATM is put out of service until a replacement cassette is inserted.

It is an object of the invention to obviate or 20 mitigate one or more of the above disadvantages.

According to the invention, a dispensing container for dispensing valuable media in sheet form is characterised in that the container has one or more frangible portions for facilitating opening of the 25 container, so that when the container is loaded into a self-service terminal, the one or more frangible portions can be broken to allow dispensing of the contents of the container.

The one or more frangible portions may be in the form 30 of perforations defining one or more openings in the

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container.

By virtue of the invention a low cost container is provided.

Preferably, the container is intended to be only one-time usable. It will be understood that the term one-time usable means that the container is not replenished with media after use. The container may be discarded after use or it may be used in a recycling process so that old containers are re-worked to produce new containers.

10 Preferably, the container is made of recyclable material such as cardboard, so that after use, a discarded container may be collected and recycled for use in another container.

15 The container may be less than 300mm in height (where the height is the dimension determining the number of media items that may be stored, the length and width determining the surface dimensions of the media that may be stored). Preferably, the container is less than 100mm in height; more preferably, less than 70mm in height; 20 advantageously, less than 50mm in height; most preferably, less than 30mm in height. The advantage of having a low height container is that fewer notes can be stored, therefore, the security risk involved in transporting the container is reduced.

25 Preferably, the container has a tamper evident construction. Conveniently, the tamper evident construction is implemented by having a seal which is highly visible when broken.

30 Preferably, the container has a machine-readable identifier. Conveniently, the machine-readable identifier

is a bar-code including information such as the number of notes stored in the container, the denomination of notes stored. Alternatively, the machine-readable identifier is an electronic tag.

5 According to the invention a self-service terminal is characterised in that the terminal incorporates

a housing for storing containers;

a breaching mechanism for providing an opening in the containers;

10 an emptying mechanism for removing valuable media from the opening in the containers; and

a discharging mechanism for discarding empty containers.

Preferably, only one container in the housing is open
15 at a time, so that a container is only opened if the previous container has been emptied. Alternatively, a second container may be opened when the number of valuable media items in a first container falls below a predetermined level.

20 Preferably, the breaching mechanism breaks one or more frangible portions in a container.

Preferably, the housing automatically presents a container to the emptying mechanism so that when the discharging mechanism discards an empty container the
25 housing presents another container to the emptying mechanism.

Conveniently, the housing stores the containers in a stack arrangement with the bottom container adjacent the emptying mechanism so that as a container is discarded the

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adjacent container falls towards the emptying mechanism. In other embodiments, the housing may store the containers in other configurations, for example a generally horizontal configuration or a circular configuration.

5 The emptying mechanism may be a conventional pick mechanism as used in conventional ATMs.

The discharging mechanism may be an actuatable support plate.

Preferably, the SST further comprises a charging slot
10 for receiving one or more containers from an owner of the SST; and a charging mechanism for loading the housing with the received containers. This feature has the advantage that the media within an SST can be replenished by the owner adding one or more containers without having to shut
15 down or open up the SST.

Preferably, the SST further comprises a testing mechanism for verifying the integrity of a tamper evident seal. The testing mechanism may be responsive to the charging mechanism so that each received container is
20 tested and only conveyed to the housing if the tamper evident seal is intact. Any container failing the verification may be retained or returned to the owner.

Preferably, the SST further comprises auditing means for reconciling on a per container basis the amount of
25 media in a container with the amount of media dispensed by the SST from that container. The advantage of this is that the contents of each container can be audited immediately after dispensing the last media item from a container. If the number of media items dispensed equals
30 the number of media items originally in the container then

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the next container may be opened. If the contents of the container are not reconciled with the number of media items dispensed then the media dispensing facility may be temporarily stopped until the SST is examined.

5 It will be appreciated that one feature of the invention is that the dispensing container does not have any urging means for urging media to one surface of the container: the urging means is incorporated in the SST into which the container is loaded.

10 Another feature of the invention is that reconciliation and auditing is performed automatically by the SST and only has to be performed manually in cases where the automatic audit fails to reconcile the media dispensed with the media in a dispensing container. When
15 these dispensing containers are used in an ATM they greatly increase the flexibility of the number and types of bank notes that can be dispensed.

Yet another feature of the invention is that an ATM using these containers can self-reconcile after each
20 container has been emptied.

A further feature of the invention is that an ATM using such containers generally only requires movement of cash to the ATM, not from the ATM to a currency centre; this obviates the requirements for high security
25 transportation from the ATM to the currency centre.

Fig 1 is a perspective view of a prior art currency cassette for use in an ATM.

An embodiment of the present invention will now be described, by way of example, with reference to the rest
30 of the accompanying drawings, in which:

Figs 2A and 2B are front perspective views of a dispensing container according to one embodiment of the invention, before and after the container is opened;

Fig 3 is a rear perspective view of the dispensing
5 container of Fig 2B;

Fig 4 is a flowchart showing the steps performed by an ATM when it receives a dispensing container;

Fig 5 is a schematic view of part of an ATM according to one embodiment of the invention; and

10 Fig 6 is a flowchart showing the steps performed by an ATM when dispensing bank notes from a container.

Referring first to Figs 2A and 2B, a dispensing container 100 in the form of a currency container is shown. The container 100 is made of cardboard and measures approximately 160mm long (dimension 102), 100mm broad (dimension 104), and 30mm high (dimension 106). The container 100 is filled with bank notes 108 (shown in dotted line) which are stacked in the container 100 as shown. The front of the container 100 has a frangible portion 110 in the form of a perforated strip extending around parts of four surfaces of the container 100 to define an opening 112.

Fig 2B shows the container 100 with the perforated strip 110 broken and the portion of cardboard defined by the strip 110 removed to reveal the opening 112. When the perforated strip 110 is broken and the cardboard removed one bank note 108 is exposed by the opening 112.

The perforated strip 110 has a tamper evident seal 111 so that on loading into an ATM, the ATM can determine

whether the container 100 has been tampered with. A bar-code 113 (Figs 2A and 2B) may be applied to one or more of the surfaces of the container 100 so that an ATM can automatically read the bar-code 113 on loading the 5 container 100 into the ATM. Typically, the bar-code 113 would contain information such as the type of notes in the container 100 and the number of notes in the container 100.

Fig 3 shows a rear perspective view of the container 10 100. The rear of the container 100 has two apertures 114 for receiving pushing rods 120 (Fig 5) for urging the bank notes 108 towards the front of the container 100.

Fig 4 is a flowchart illustrating the steps performed by an ATM when a container 100 is loaded into the ATM. 15 The container 100 is loaded into the ATM via a container deposit drawer in the ATM. The ATM receives the container 100 (step 130) and verifies that the tamper evident seal 111 is intact (step 132). If the seal 111 is not intact then the container is rejected (step 134); if the seal is 20 intact then the bar-code 113 on the container 100 is read (step 136). The data read from the bar-code 113 is then stored in a memory (the memory is not shown) (step 138) and the container 100 is conveyed to a housing for storage (step 140).

25 Fig 5 is a schematic view of part of an ATM and shows a housing 150 for storing containers 100 in a stack. Five containers 100a,b,c,d,e are shown stored in the housing 150, and one container 100f is shown being discharged from the housing 150 into a receptacle 152. In Fig 5 the dark 30 shading in each container 100 indicates how full of bank

notes that container is.

A discharging mechanism 160 is located at the bottom of the housing 150. The discharging mechanism 160 comprises a support plate 162, an actuator 164, and 5 actuatable separating fingers 166. The lowest of the five stored containers 100e is supported by plate 162 and the other containers are spaced apart by the separating fingers 166.

When a container (e.g. 100f) is empty then it is 10 discarded into receptacle 152. This is implemented by the support plate 162 being retracted from the housing 150 by actuator 164. This causes the container 100f to fall into receptacle 152 under the influence of gravity. The support plate 162 is then inserted into the housing 150. 15 The lowest separating finger 166 is then retracted to allow container 100e to fall to the position previously occupied by container 100f; the lowest separating finger 166 is then returned to its original position. The second lowest separating finger 166 is then retracted to allow 20 container 100d to fall to the position previously occupied by 100e. This process continues until all of the containers 100 have moved down the housing 150. Thus, the containers 100 ripple down the housing each time that a container 100 is ejected from the housing.

25 Fig 6 shows the process steps involved in dispensing notes from the containers 100 and in loading new containers 100.

Referring to Fig 5 and Fig 6, as container 100e arrives at the plate 162, a breaching mechanism 170 30 engages the container 100e and removes the perforated

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strip 110 to define the window 112 (step 200). An emptying mechanism 172 in the form of a conventional ATM pick wheel is then aligned with the opening 112 for removing individual bank notes 108 from the container 100e (step 202). Notes are dispensed in response to cash withdrawal requests until the container 100e is empty (steps 202 and 204).

When the container 100e is empty (i.e. when the last bank note 108 has been dispensed) then the support plate 162 is retracted by the actuator 164 and the empty container 100e falls into receptacle 152 for disposal or recycling.

The ATM accesses the memory storing the bar-code information (step 206) and attempts to reconcile (step 208) the number of notes dispensed from container 100e with the number of notes in the container 100e as stated in the bar-code information (stored in memory).

If the number of notes dispensed does not equal the number of notes stated to be in the container 100e then an audit fail message is generated (step 210). If the number of notes dispensed equals the number of notes stated to be in the container 100e then the ATM proceeds to load the next container 100d (step 212) and the above procedure is repeated. If there are no more containers 100 then a money shortage message is generated (step 214) to notify the owner of the ATM that more containers 100 are required.

The auditing and reconciling procedure may be performed by the ATM processor as ATMs record every transaction for auditing purposes.

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Using containers 100 in an ATM ensures that the only reverse cash in transit is from the reject bin (a standard feature on all ATMs for storing bank notes which have not dispensed properly): there are no partially filled
5 currency cassettes.

Various modifications may be made to the above described embodiments within the scope of the present invention. For example, in other embodiments, other configurations of housings may be used; for example, the
10 housing may be configured so that containers are stored in a rotary arrangement. The frangible portions may be in the form of, for example, one or more weakened sections in the container, or one or more straps which maintain a flap in a closed position. In other embodiments, the
15 containers may dispense share certificates, stamps, tickets, and such like.

CLAIMS

1. A dispensing container for dispensing valuable media in sheet form characterised in that the container has one or more frangible portions for facilitating opening of the 5 container, so that when the container is loaded into a self-service terminal, the one or more frangible portions can be broken to allow dispensing of the contents of the container.
2. A container according to claim 1, wherein the one or 10 more frangible portions are perforations defining one or more openings in the container.
3. A container according to claim 1 or 2, wherein the container has a tamper evident construction.
4. A container according to any preceding claim, wherein 15 the container has a machine-readable identifier.
5. A self-service terminal characterised in that the terminal incorporates: a housing for storing containers; a breaching mechanism for providing an opening in the containers; an emptying mechanism for removing valuable 20 media from the opening in the containers; and a discharging mechanism for discarding empty containers.
6. A self-service terminal according to claim 5, wherein the breaching mechanism breaks one or more frangible portions in a container.
- 25 7. A self-service terminal according to claim 5 or 6, wherein the housing automatically presents a container to the emptying mechanism so that when the discharging mechanism discards an empty container the housing presents

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another container to the emptying mechanism.

8. A self-service terminal according to any of claims 5 to 7, wherein the SST further comprises a charging slot for receiving one or more containers from an owner of the
5 SST; and a charging mechanism for loading the housing with the received containers.

9. A self-service terminal according to any of claims 5 to 8, wherein the SST further comprises a testing mechanism for verifying the integrity of a tamper evident
10 seal.

10. A self-service terminal according to any of claims 5 to 9, wherein the SST further comprises auditing means for reconciling the amount of media in a container with the amount of media dispensed by the SST from that container.

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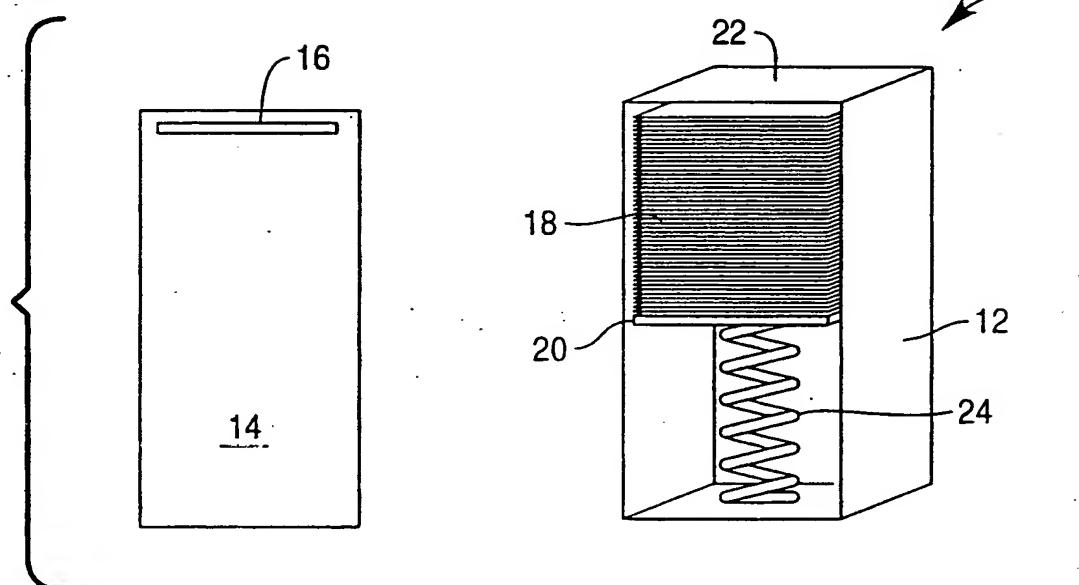
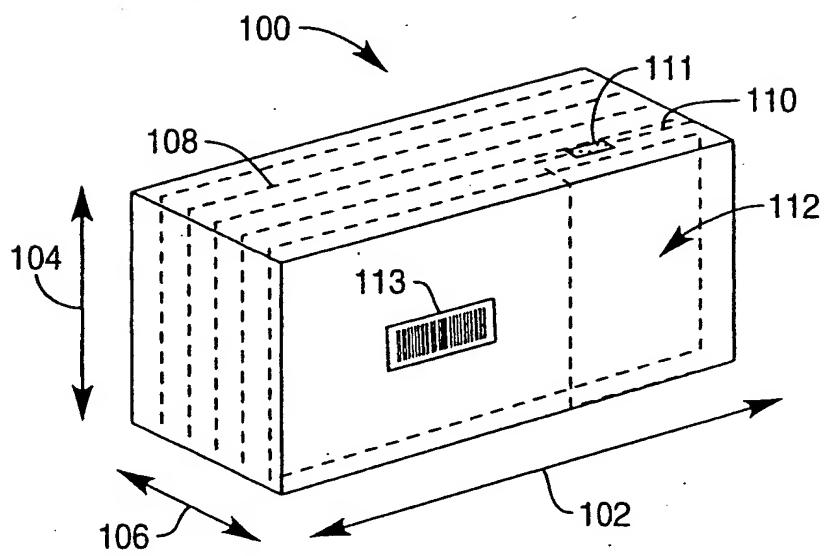
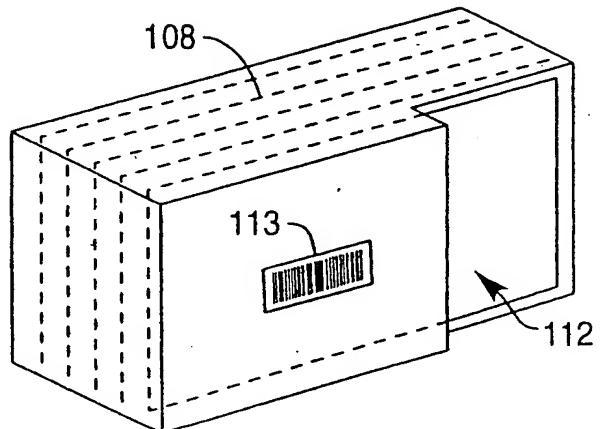
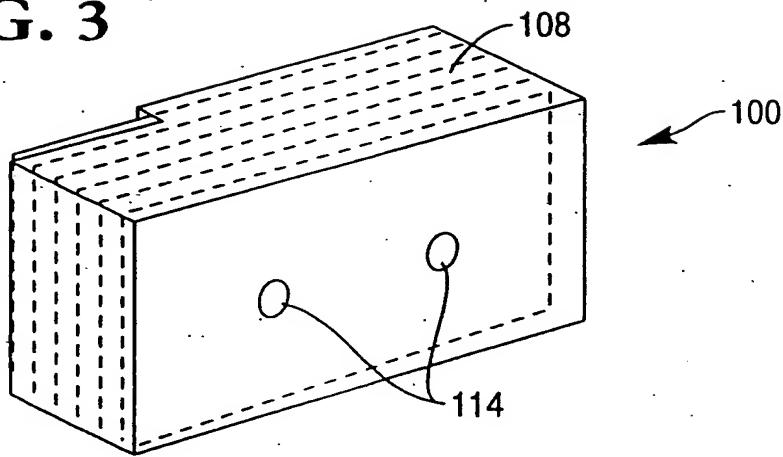
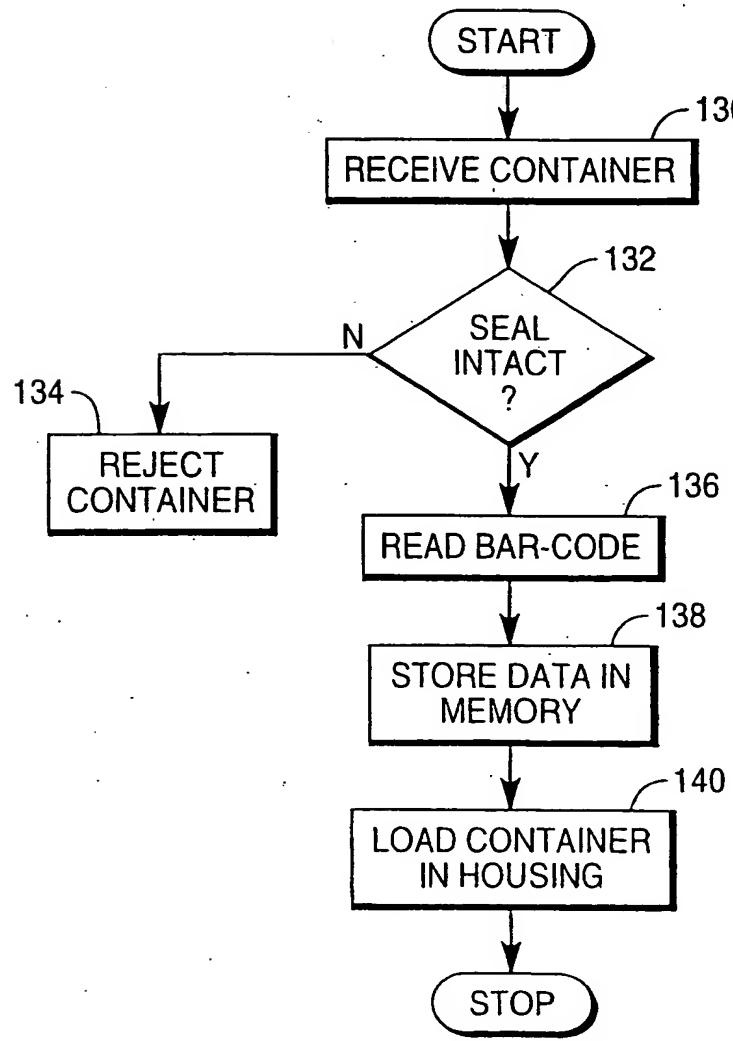
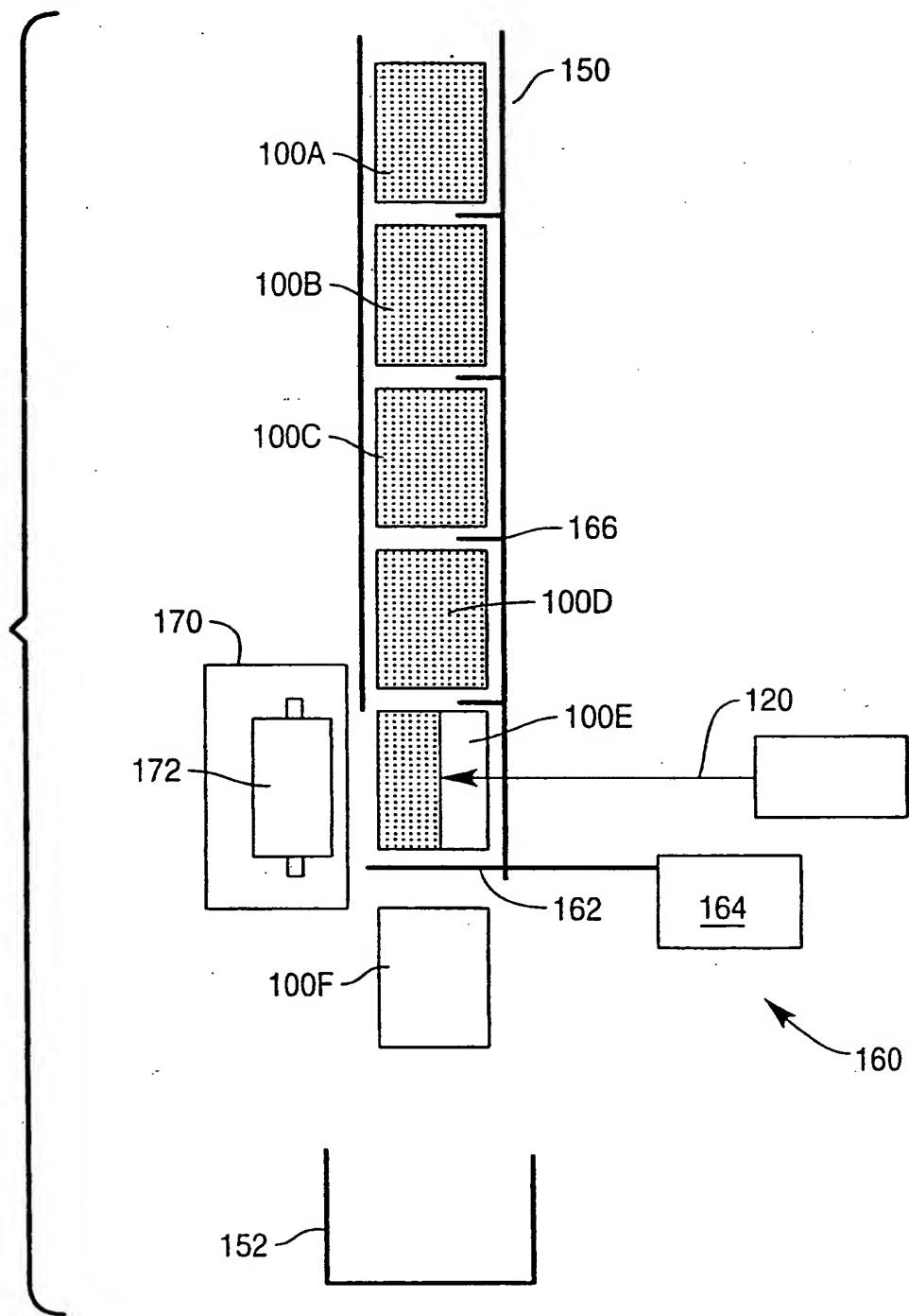
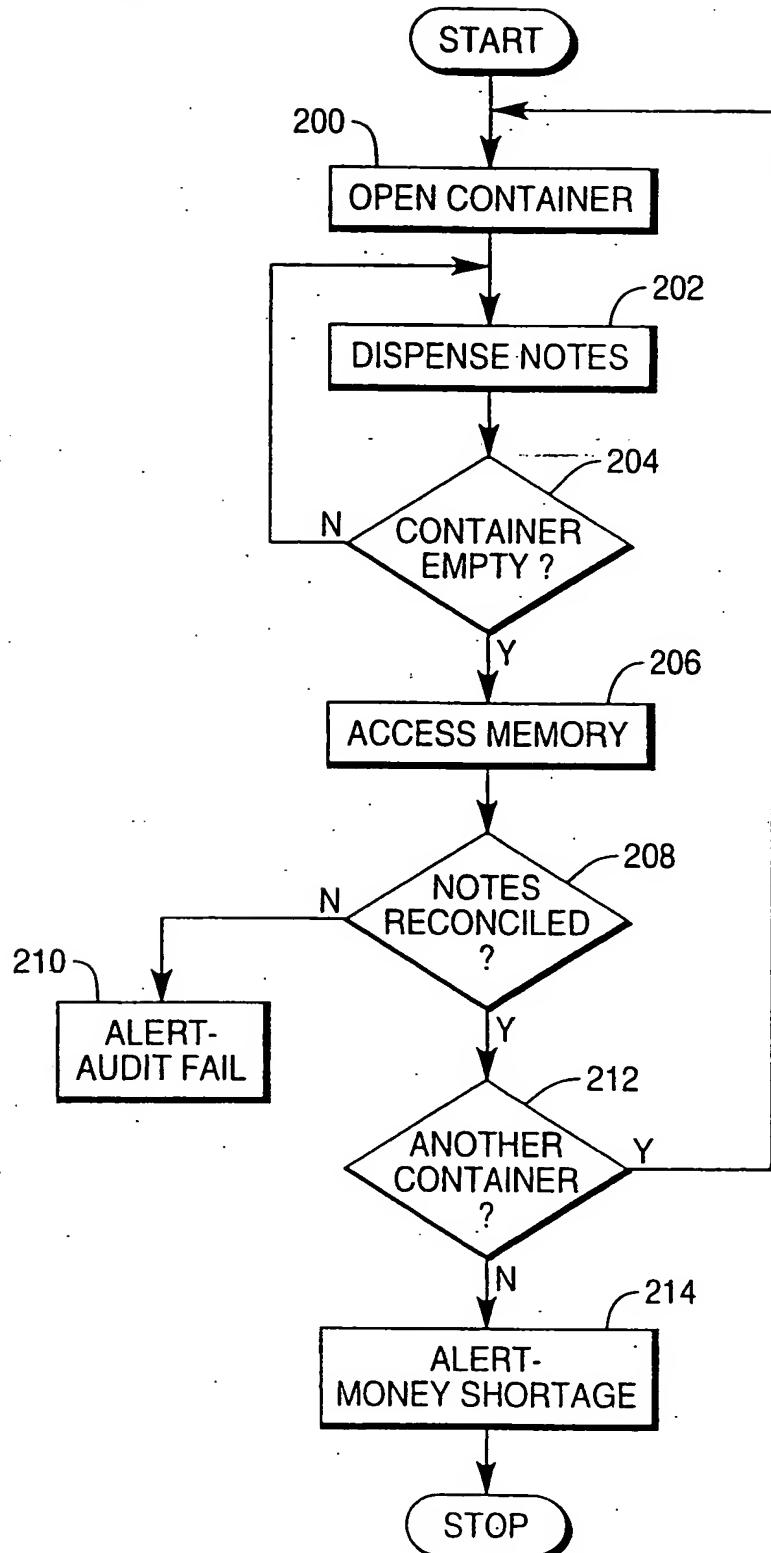
FIG. 1**PRIOR ART****FIG. 2A****FIG. 2B**

FIG. 3**FIG. 4**

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FIG. 5

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FIG. 6

INTERNATIONAL SEARCH REPORT

Inten
nal Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07D11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G07D E05G G07B G07F

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	WO 94 17274 A (HEMA BV ;BAVAK BEVEILIGINGSGROEP BV (NL); W VAN TONGEREN ARCHITEKT) 4 August 1994 (1994-08-04) page 10, line 17 - line 26 page 10, line 32 - line 34; figure 10	5
A	WO 94 17274 A (HEMA BV ;BAVAK BEVEILIGINGSGROEP BV (NL); W VAN TONGEREN ARCHITEKT) 4 August 1994 (1994-08-04) page 10, line 17 - line 26 page 10, line 32 - line 34; figure 10	1,4
A	US 4 529 119 A (GRANZOW ROBERT H ET AL) 16 July 1985 (1985-07-16) abstract; figure 1 column 4, line 13 - line 17	1
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Patent family members are listed in annex.

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Date of the actual completion of the International search

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Date of mailing of the International search report

22/02/2000

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/03677

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